

November 30, 2016

Docket Nos.: 50-348

NL-16-2438

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555-0001

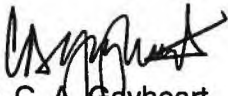
Joseph M. Farley Nuclear Plant – Unit 1  
Licensee Event Report 2016-002-00  
Automatic Reactor Trip and Safety Injection Due to Closure  
of Main Steam Isolation Valve

Ladies and Gentlemen:

This Licensee Event Report is being submitted pursuant to the requirements of the Code of Federal Regulations, 10 CFR 50.73(a)(2)(iv)(A), for an automatic actuation of the Reactor Protection System, ECCS actuation, and an automatic start of the Auxiliary Feedwater system.

This letter contains no NRC commitments. If you have any questions regarding the submittal, please contact Ms. Julie Collier at (334) 814-4639.

Sincerely,



Ms. C. A. Gayheart  
Vice President – Farley

CAG/JAC

Enclosure: Unit 1 Licensee Event Report 2016-002-00

cc: Southern Nuclear Operating Company  
Mr. S. E. Kuczynski, Chairman, President & CEO  
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer  
Mr. M. D. Meier, Vice President – Regulatory Affairs  
Mr. D. R. Madison, Vice President – Fleet Operations  
Mr. B. J. Adams, Vice President – Engineering  
Mr. C. R. Pierce, Regulatory Affairs Director  
Ms. B. L. Taylor, Regulatory Affairs Manager – Farley  
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RTYPE: CFA04.054

U. S. Nuclear Regulatory Commission  
Ms. C. Haney, Regional Administrator  
Mr. S. A. Williams, NRR Project Manager - Farley  
Mr. P. K. Niebaum, Senior Resident Inspector - Farley

Joseph M. Farley Nuclear Plant – Unit 1  
Unit 1 Licensee Event Report 2016-002-00

Automatic Reactor Trip and Safety Injection Due to Closure  
of Main Steam Isolation Valve



## LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollections.Resource@nrc.gov](mailto:Infocollections.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME		2. DOCKET NUMBER		3. PAGE	
Joseph M. Farley Nuclear Plant, Unit 1		05000 - 348		1 OF 3	

4. TITLE
Automatic Reactor Trip and Safety Injection Due to Closure of Main Steam Isolation Valve

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	1	2016	2016	- 002 -	00	11	30	2016		

9. OPERATING MODE  1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
10. POWER LEVEL  99%	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER	
LICENSEE CONTACT  Julie Collier	TELEPHONE NUMBER (Include Area Code)  334-814-4639

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT									
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
E	SB	PSV	A499	Y					

14. SUPPLEMENTAL REPORT EXPECTED  <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 10/1/2016 at 0512 CDT with Unit 1 at 99 percent power the plant experienced a turbine trip and automatic reactor trip as a result of inadvertent closure of the 1A Steam Generator Main Steam Isolation Valve (MSIV). This caused a rapid pressure reduction in the remaining two Steam Generators' steam lines, resulting in a Safety Injection (SI). The 1A MSIV closure was caused by failure of its test solenoid in conjunction with other air system leakage, which vented air pressure from the 1A MSIV actuator. An inadequate technical justification allowed the improper deactivation of the preventive maintenance (PM) task of the test solenoid valve in 2004. Decision making by control room personnel not to strictly adhere to an Annunciator Response Procedure was a contributing cause to the reactor trip being automatic versus manual, and led to the SI. Following the reactor trip and SI the 1A MSIV test solenoid was replaced and check valves on the 1A MSIV steam line were tested and replaced. The technical justifications of a sample of previously extended or deleted PMs strategies will be reviewed and corrected. The PM for the Unit 1 solenoid will be reinstated. Procedure use and adherence standards have been reinforced with Operations personnel, simulator just-in-time training was conducted for all crews, and further causal analysis is planned to investigate operations fundamental performance gaps. This event is reportable per 10 CFR 50.73(a)(2)(iv)(A) due to actuation of the reactor protection system, Emergency Core Cooling System (ECCS) injection into the Reactor Coolant System, and automatic actuation of the AFW system.

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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Joseph M. Farley Nuclear Plant, Unit 1	05000- 348	2016	- 002 -	00

**NARRATIVE****A. PLANT AND SYSTEM IDENTIFICATION**

Westinghouse - Pressurized Water Reactor

**B. DESCRIPTION OF EVENT**

On 10/1/2016 at 0512 CDT with Unit 1 at 99 percent power and coasting down in power for a planned refueling outage, the Control Room received dual indication for the 1A Steam Generator (SG) Main Steam Isolation Valve (MSIV), a closed indication for the 1A MSIV test switch, and a Main Control Board (MCB) annunciator for main steam line isolation valve air pressure being low. Operations personnel implemented the Annunciator Response Procedure (ARP) for this annunciator and followed the first step, which was to attempt to recharge the accumulator by placing the switch for the 1A MSIV to the 'open' position. Although the second step directed tripping the reactor if the alarm was in and dual indication was indicated, Operations instead dispatched licensed and non-licensed personnel into the plant to investigate the cause for the alarm. The normally closed test solenoid vent port was found to be releasing air. Operations initiated steps to isolate the leaking test solenoid valve; however, the leaking solenoid and check valves caused air pressure in the 1A MSIV actuator to fall low enough to cause inadvertent 1A MSIV closure. Actuation of the 1A MSIV turbine trip limit switch initiated a turbine trip and subsequent reactor trip.

The closure of the 1A MSIV caused a rapid pressure reduction in the remaining two Steam Generators' steam lines and resulted in actuation of a Safety Injection (SI). The Emergency Core Cooling System (ECCS) actuated and injected into the Reactor Coolant System (RCS). Auxiliary Feedwater (AFW) auto-started. All Control rods fully inserted and all equipment actuated as designed. The unit was stabilized in Mode 3 with decay heat removed through the condenser.

The test solenoid had last been replaced in 2003. The Preventive Maintenance (PM) task for this component was improperly deactivated in 2004 due to inadequate technical justification.

Decision making by control room personnel not to strictly adhere to the ARP was a contributing cause to the reactor trip being automatic versus manual, and led to the SI. Manual actuation of a reactor trip prior to the closure of the 1A MSIV would have prevented the SI from occurring.

**C. UNIT STATUS AT TIME OF EVENT**

Unit 1, Mode 1, 99 percent power  
Unit 2, Mode 1, 100 percent power

**D. CAUSE OF EVENT**

The 1A MSIV closure was caused by failure of its test solenoid in conjunction with other air system leakage, which vented the air pressure from the 1A MSIV actuator. An inadequate technical justification allowed the improper deactivation of the PM task of the test solenoid valve in 2004 and led to the component failure. Decision making by control room personnel not to strictly adhere to the ARP was a contributing cause to the reactor trip being automatic versus manual, and led to the SI.



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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**NARRATIVE****E. REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT**

This event is reportable per 10 CFR 50.73(a)(2)(iv)(A) due to actuation of the reactor protection system, actuation and injection of ECCS into the RCS, and automatic actuation of the AFW system.

The 1A MSIV closing caused steam flow in steam line A to decrease, and steam flow increased and steam pressure decreased in steam lines B and C. The rate of steam pressure decrease in steam lines B and C resulted in the initiation of the safety injection signal. All systems responded as required, including all control rods fully inserting into the core, AFW system auto-starting to supply the Steam Generators, and decay heat removal occurring through the condenser. This system response to the event was as designed for turbine trip, reactor trip, and SI actuation.

Because all systems responded as required and there were no actual adverse effects on the health and safety of the public, the safety significance of this event is considered very low.

**F. CORRECTIVE ACTION**

The 1A MSIV test solenoid was replaced. In addition, all of the test solenoids for all Unit 1 MSIVs were replaced. The check valves on the 1A MSIV steam line were tested and replaced. The PM for the Unit 1 solenoid will be reinstated. The technical justifications of a sample of previously extended or deleted PM strategies will be reviewed and corrected. Prior to Unit 1 entering Mode 3 all Unit 1 MSIV test solenoid isolation valves were closed to prevent a loss of air through the test portion of the lines.

The Unit 2 main steam system was walked down for similar issues, and needed test solenoid replacements will be completed by the end of the next refueling outage. In addition, the Unit 2 MSIV test solenoid isolation valves were closed to prevent a loss of air through the test portion of the lines.

Procedure use and adherence standards have been reinforced with Operations personnel, simulator just-in-time training was conducted for all crews, and further causal analysis is planned to investigate operations fundamental performance gaps.

**G. ADDITIONAL INFORMATION**

- 1) Failed Components: Loop A test solenoid valve for the 1A MSIV
- 2) Previous Similar Events: None
- 3) Other system affected: None
- 4) Commitment Information: None
- 5) Energy Industry Identification System Code:  
[JC]- Reactor Protection System  
[BA]-Auxiliary Feedwater  
[SB]- Main Steam System